

**WHAT IS CLAIMED IS:**

1. A cathode ray tube comprising: a panel having a fluorescent formed on an inner surface thereof; a funnel connected to the panel; an electron gun housed in the funnel, emitting electron beams; a deflection yoke for deflecting the electron beams in horizontal and vertical directions; a shadow mask for selecting colors of the electron beams; and a mask frame for supporting the shadow mask, wherein an outer surface of the panel is substantially flat and an inner surface has a designated curvature, and a radius of curvature from a center of the shadow mask in a major-axis, minor-axis and diagonal-axis direction is substantially same.

2. The cathode ray tube according to claim 1, wherein radii of curvature of the shadow mask are substantially same within the length  $H/12$  from the center of the shadow mask,  $H$  being a minor-axis direction length of the shadow mask.

3. The cathode ray tube according to claim 1, wherein radii of curvature of the shadow mask are substantially same as a distance from the center of the shadow mask is increased in the major-axis, minor-axis and diagonal-axis directions.

4. The cathode ray tube according to claim 1, wherein if the shadow mask satisfies a curvature radius expansion expressed by  $Z(x, y) = ax^2 + bx^4 + cy^2 +$

$dy^4+ex^2y^2+fx^4y^2+gx^2y^4+hx^4y^4$ ,  $b/a$  satisfies a condition of  $2.2 \times 10^{-6} < b/a < 4.4 \times 10^{-6}$ ,  $x$  and  $y$  being a distance (mm) from the center of the shadow mask to a point respectively, and  $Z$  being a height difference (mm) between the center of the shadow mask and a point on the shadow mask.

5. The cathode ray tube according to claim 1, wherein if the shadow mask satisfies a curvature radius expansion expressed by  $Z(x, y) = ax^2+bx^4+cy^2+dy^4+ex^2y^2+fx^4y^2+gx^2y^4+hx^4y^4$ ,  $d/c$  satisfies a condition of  $2.2 \times 10^{-6} < d/c < 4.4 \times 10^{-6}$ ,  $x$  and  $y$  being a distance (mm) from the center of the shadow mask to a point respectively, and  $Z$  being a height difference (mm) between the center of the shadow mask and a point on the shadow mask.

6. The cathode ray tube according to claim 1, wherein if the shadow mask satisfies a curvature radius expansion expressed by  $Z(x, y) = ax^2+bx^4+cy^2+dy^4+ex^2y^2+fx^4y^2+gx^2y^4+hx^4y^4$ ,  $b/a$  satisfies a condition of  $2.2 \times 10^{-6} < b/a < 4.4 \times 10^{-6}$  and  $d/c$  satisfies a condition of  $2.2 \times 10^{-6} < d/c < 4.4 \times 10^{-6}$ ,  $x$  and  $y$  being a distance (mm) from the center of the shadow mask to a point respectively, and  $Z$  being a height difference (mm) between the center of the shadow mask and a point on the shadow mask.

7. The cathode ray tube according to claim 1, wherein if the radius of curvature from a center of the shadow mask in a major-axis direction is  $R_{xo}$ , the radius of curvature in

a minor-axis direction  $R_{yo}$ , and the radius of curvature in a diagonal-axis direction  $R_{do}$ , the  $R_{yo}$  has the lowest value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ .

8. The cathode ray tube according to claim 1, wherein a thickness of the shadow mask is not greater than 0.1mm.

9. The cathode ray tube according to claim 1, wherein a transmittance at a central portion of the panel is in a range of 45 - 75%.

10. A cathode ray tube comprising: a panel having a fluorescent formed on an inner surface thereof; a funnel connected to the panel; an electron gun housed in the funnel, emitting electron beams; a deflection yoke for deflecting the electron beams in horizontal and vertical directions; a shadow mask for selecting colors of the electron beams; and a mask frame for supporting the shadow mask, wherein an outer surface of the panel is substantially flat and an inner surface has a designated curvature, and if a radius of curvature from a center of the shadow mask in a major-axis direction is  $R_{xo}$ , a radius of curvature in a minor-axis direction  $R_{yo}$ , and a radius of curvature in a diagonal-axis direction  $R_{do}$ , the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$  are not less than 85% of a maximum value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ .

11. The cathode ray tube according to claim 10, wherein the  $R_{yo}$  has the lowest value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ .

12. The cathode ray tube according to claim 10, wherein the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$  are not less than 88% of a maximum value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ .

13. The cathode ray tube according to claim 12, wherein the  $R_{yo}$  has the lowest value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ .

14. The cathode ray tube according to claim 10, wherein the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$  within the length  $H/12$  from the center of the shadow mask are not less than 85% of the maximum value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ ,  $H$  being a minor-axis direction length of the shadow mask.

15. The cathode ray tube according to claim 14, wherein the  $R_{yo}$  has the lowest value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ .

16. The cathode ray tube according to claim 10, wherein if the radius of curvature in the major-axis direction from the shadow mask center is  $R_{xo}$ , the radius of curvature in the minor-axis direction  $R_{yo}$ , the radius of curvature in the diagonal-axis direction  $R_{do}$ , a radius of curvature at the end of the effective surface in the major-axis direction of the shadow mask  $R_{xf}$ , a radius of curvature at the end of the effective surface in the minor-axis direction  $R_{yf}$ , and a radius of curvature at the end of the effective surface in the diagonal-axis

direction Rdf, at least one of Rxf/Rxo, Ryf/Ryo and Rdf/Rdo satisfies conditions of 44.7%  $<Rxf/Rxo < 77.6\%$ , 59.0%  $<Ryf/Ryo < 86.1\%$  and 34.6%  $<Rdf/Rdo < 69.2\%$ .

17. The cathode ray tube according to claim 10, wherein if the radius of curvature in the major-axis direction from the shadow mask center is Rxo, the radius of curvature in the minor-axis direction Ryo, the radius of curvature in the diagonal-axis direction Rdo, a radius of curvature at the end of the effective surface in the major-axis direction of the shadow mask Rxf, a radius of curvature at the end of the effective surface in the minor-axis direction Ryf, and a radius of curvature at the end of the effective surface in the diagonal-axis direction Rdf, at least one of Rxf/Rxo, Ryf/Ryo and Rdf/Rdo satisfies conditions of 62.6%  $<Rxf/Rxo < 77.6\%$ , 74.9%  $<Ryf/Ryo < 86.1\%$  and 52.1%  $<Rdf/Rdo < 69.2\%$ .

18. The cathode ray tube according to claim 10, wherein a thickness of the shadow mask is not greater than 0.1mm.

19. The cathode ray tube according to claim 10, wherein a transmittance at a central portion of the panel is in a range of 45 – 75%.

20. A cathode ray tube comprising: a panel having a fluorescent formed on an inner surface thereof; a funnel connected to the panel; an electron gun housed in the funnel,

emitting electron beams; a deflection yoke for deflecting the electron beams in horizontal and vertical directions; a shadow mask for selecting colors of the electron beams; and a mask frame for supporting the shadow mask, wherein an outer surface of the panel is substantially flat and an inner surface has a designated curvature, and if a minor-axis direction length of the shadow mask is  $H$ , a radius of curvature from a center of the shadow mask in a major-axis direction is  $R_{xo}$ , a radius of curvature in a minor-axis direction  $R_{yo}$ , and a radius of curvature in a diagonal-axis direction  $R_{do}$ , the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$  within the length  $H/12$  from the center of the shadow mask satisfy a condition of

$$\frac{\text{Max}(R_{xo}, R_{yo}, R_{do}) - \text{Min}(R_{xo}, R_{yo}, R_{do})}{\text{Max}(R_{xo}, R_{yo}, R_{do})} \leq 0.15.$$

21. The cathode ray tube according to claim 20, wherein if the radius of curvature in the major-axis direction from the shadow mask center is  $R_{xo}$ , the radius of curvature in the minor-axis direction  $R_{yo}$ , the radius of curvature in the diagonal-axis direction  $R_{do}$ , a radius of curvature at the end of the effective surface in the major-axis direction of the shadow mask  $R_{xf}$ , a radius of curvature at the end of the effective surface in the minor-axis direction  $R_{yf}$ , and a radius of curvature at the end of the effective surface in the diagonal-axis direction  $R_{df}$ , at least one of  $R_{xf}/R_{xo}$ ,  $R_{yf}/R_{yo}$  and  $R_{df}/R_{do}$  satisfies conditions of 44.7% <  $R_{xf}/R_{xo}$  < 77.6%, 59.0% <  $R_{yf}/R_{yo}$  < 86.1% and 34.6% <  $R_{df}/R_{do}$  < 69.2%.

22. The cathode ray tube according to claim 20, wherein if the radius of curvature in the major-axis direction from the shadow mask center is  $R_{xo}$ , the radius of curvature in

the minor-axis direction  $R_{yo}$ , the radius of curvature in the diagonal-axis direction  $R_{do}$ , a radius of curvature at the end of the effective surface in the major-axis direction of the shadow mask  $R_{xf}$ , a radius of curvature at the end of the effective surface in the minor-axis direction  $R_{yf}$ , and a radius of curvature at the end of the effective surface in the diagonal-axis direction  $R_{df}$ , at least one of  $R_{xf}/R_{xo}$ ,  $R_{yf}/R_{yo}$  and  $R_{df}/R_{do}$  satisfies conditions of  $62.6\% < R_{xf}/R_{xo} < 77.6\%$ ,  $74.9\% < R_{yf}/R_{yo} < 86.1\%$  and  $52.1\% < R_{df}/R_{do} < 69.2\%$ .

23. The cathode ray tube according to claim 20, wherein the  $R_{yo}$  has the lowest value among the  $R_{xo}$ ,  $R_{yo}$  and  $R_{do}$ .

24. The cathode ray tube according to claim 20, wherein a thickness of the shadow mask is not greater than 0.1mm.

25. The cathode ray tube according to claim 20, wherein a transmittance at a central portion of the panel is in a range of 45 – 75%.